Spatiotemporal Dimensions of Vegetation Dynamic and its Relationship to Human Activities in the Semiarid Zone of White Nile State, Sudan

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Abstract

The vegetation cover is one of the most important components of the ecosystems of the world zones, particularly of the dry zones (vulnerable land). It is always in dynamic status through the time series in different regions, and in the vulnerable land particularly. It is responsible for equilibrium of the environment, therefore it needs accurate monitoring and assessing for its dynamic and its relation to human activities such as the land use practices, so that the study carried out aiming to map, to monitor, and to analyse the status (rate and trend) of vegetation dynamic, and its relationship to human activities (different land use patterns) through spatial and temporal dimensionality in semi arid of the White Nile State (El geteina area), Sudan. The study area is one of the important States of Sudan lies in the centre. The synergism approach of Remote Sensing, ground truth and socioeconomic data was mainly utilised for performing the study objectives. Whereas that Vegetation indices (NDVI and SAVI), Hybrid classification approach-Mahalanobis Distance classifier, and post classification (change detection and matrix) was done to analyse the satellite images data of MSS 1973, TM 1986, and ASTER 2009 (for 36 year). Through the analysis, the pre processing and processing of images data fusing with ancillary data was done, to derive information using ERDAS IMAGINE and arcGIS. The results depicted that the vegetation cover increased 0.093239 Km^2 estimated with 0.007 Km^2 annually between 1973 and 1986, and it decreased 22.911 Km^2 estimated with 1.761 Km^2 annually between 1986 and 2009. As well as they showed that 3.19 Km^2 of the vegetation cover converted to agricultural land and at the same time 9.54 Km^2 of agricultural land covered by the vegetation between 1973 and 1986, and 3.96 of the vegetation converted to agricultural land and 1.35 Km^2 of the agricultural land covered by the vegetation. So the results illustrated that the relationship between the vegetation dynamic and the human activities was obviously.

Keywords: Human activities, remote sensing, vegetation, White Nile State

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